What is claimed is:

CLAIMS

1. A method for improving the operation of a remote viewing device, the method comprising:

removing at least a portion of slack from at least one control cable attached to a servo motor, the removing at least a portion of slack including at least changing a distance between the servo motor and a flexible tube termination block until a specified tension is encountered in the at least one control cable;

fixing the servo motor where the specified tension is encountered;

determining a first servo control signal value corresponding to no angular deflection in a viewing head of the remote viewing device; and

increasing the viewing head's range of motion, the increasing the range of motion including at least determining a second servo control signal value corresponding to a first angular deflection in the viewing head.

2. The method according to claim 1 further comprising determining a third servo control signal value corresponding to a second angular deflection in the viewing head of the remote viewing device.

3. The method according to claim 1 further comprising storing the value of the first and second servo control signal values in a memory of a control unit of the remote viewing device.

4. The method according to claim 1 further comprising placing a recalibration cap over the viewing head in a first position, wherein the recalibration cap in the first position fixes the viewing head in an undeflected position.

5. The method according to claim 4 wherein the determining a second servo control signal value includes:

placing a recalibration cap over the viewing head in a second position, wherein the recalibration cap in the second position allows the viewing head to deflect a first number of degrees; and

rotating the viewing head a first number of degrees until it is in contact with the recalibration cap.

6. The method according to claim 4 wherein the determining a second servo control signal value includes:

placing a recalibration cap over the viewing head in a second position, wherein the recalibration cap in the second position allows the viewing head to deflect a first number of degrees; and

rotating the viewing head until imaging optics in the viewing head view a predetermined target.

7. The method according to claim 1 further comprising placing a first recalibration cap over the viewing head, wherein the first recalibration cap fixes the viewing head in an undeflected position.

8. The method according to claim 7 wherein the determining a second servo control signal value includes:

placing a second recalibration cap over the viewing head, wherein the second recalibration cap allows the viewing head to deflect a first number of degrees; and

rotating the viewing head the first number of degrees until it is in contact with the second recalibration cap.

9. The method according to claim 1 wherein the first and second servo control signal values are used to recalibrate the operation of the remote viewing device to increase the viewing head's range of motion.

10. The method according to claim 9 wherein the recalibration includes changing a stroke of the servo motor.

11. The method according to claim 9 wherein the recalibration includes changing a force applied by the servo motor.

12. The method according to claim 1 further comprising determining an extrapolated servo control signal value for an arbitrary deflection in the viewing head, the determining the extrapolated servo control signal value using at least the first and second servo control signal values.

13. The method according to claim 1 wherein the at least one control cable is a plurality of control cables and the determining a first servo control signal value that corresponds to no angular deflection in the viewing head of the remote viewing device includes at least equalizing tensions in the plurality of control cables.

14. The method according to claim 1 wherein the remote viewing device is one of: a borescope, a fiberscope, or an endoscope.

15. A system for improving the operation of a remote viewing device, the system comprising:

a remote viewing device control unit;

a remote viewing device viewing head;

a remote viewing device flexible tube connected at a proximal end to the control unit and at the distal end to the viewing head; and

at least one servo motor located in the control unit and connected to at least one control cable that passes through the flexible tube and is attached to the viewing head, a distance between the at least one servo motor and a flexible tube termination block capable of being varied to remove at least a portion of slack in the at least one control cable.

16. The system according to claim 15 further comprising:

at least one servo motor support rail attached to a support structure in the remote viewing device control unit;

a spring connected to the support structure and the at least one servo motor;

a top groove plate attached to the at least one servo motor; and

a bottom groove plate coupled to an engagement screw,

wherein the engagement screw engages and disengages the top and bottom groove plates such that when the top and bottom groove plates are engaged the at least one servo motor is held in a fixed position and when the top and bottom groove plates are disengaged the at least one servo

motor is moved by the spring on the servo motor support rail until a specified tension is encountered in the at least one control cable.

17. The system according to claim 16 wherein the adjustment screw is manually adjusted through an opening in the control unit.

18. The system according to claim 16 wherein the adjustment screw is automatically adjusted by an adjustment servo motor.

19. The system according to claim 15 further comprising:

at least one track attached to a support structure in the remote viewing device control unit;

at least one rail attached to the at least one servo motor, the at least one rail movably connected to the at least one track; and

an adjustment screw,

wherein the adjustment screw changes the location of the at least one servo motor along the track allowing a specified tension to be achieved in the at least one control cable.

20. The system according to claim 19 wherein the adjustment screw is manually adjusted through an opening in the control unit.

21. The system according to claim 19 wherein the adjustment screw is automatically adjusted by an adjustment servo motor.

22. The system according to claim 15 further comprising:

at least one track attached to a support structure in the remote viewing device control unit;

at least one rail attached to the flexible tubing termination block, the at least one rail movably connected to the at least one track; and

an adjustment screw,

wherein the adjustment screw changes the location of the flexible tubing termination block along the track allowing a specified tension to be achieved in the at least one control cable.

23. The system according to claim 22 wherein the adjustment screw is manually adjusted through an opening in the control unit.

24. The system according to claim 22 wherein the adjustment screw is automatically adjusted by an adjustment servo motor.

25. The system according to claim 15 wherein the flexible tube termination block is a threaded flexible tube termination block that is placed in a threaded housing, rotation of the threaded flexible tube termination block changing the distance between the at least one servo motor and the threaded flexible termination block.

26. The system according to claim 15 further comprising a recalibration cap including at least a distal non-deflection region, a middle deflection region, and a proximal clasping region, wherein the distal non-deflection region is capable of maintaining the viewing head in a substantially undeflected position and the middle deflection region permits the viewing head to deflect a specified number of degrees.

27. The method according to claim 15 wherein the remote viewing device is one of: a borescope, a fiberscope, or an endoscope.

28. A system for improving the operation of a remote viewing device, the system comprising:

a remote viewing device control unit including at least a microprocessor, a memory unit, a servo control unit, and a servo motor, the microprocessor operatively coupled to the memory unit and the servo control unit and the servo motor operatively coupled to the servo motor control unit;

a remote viewing device viewing head;

a remote viewing device flexible tube connected at a proximal end to the control unit and at the distal end to the viewing head;

at least one control cable connected to the servo motor and the remote viewing device viewing head and passing through the remote viewing device flexible tube; and

a software routine stored in the memory unit, the software routine directing the microprocessor and the servo control unit to remove slack from the at least one control cable.

29. The system according to claim 28 wherein the removal of slack includes at least:

moving the servo motor to a first location where a specified tension is encountered in at least one of the at least one control cables; and

fixing the servo motor at the first location thereby establishing a fixed relative distance between the servo motor and the flexible tube termination block.

30. A system for improving the operation of a remote viewing device, the system comprising:

a remote viewing device control unit including at least a microprocessor, a memory unit, a servo control unit, and a servo motor, the microprocessor operatively coupled to the memory unit and the servo control unit and the servo motor operatively coupled to the servo motor control unit;

a remote viewing device viewing head;

a remote viewing device flexible tube connected at a proximal end to the control unit and at the distal end to the viewing head;

at least one control cable connected to the servo motor and the remote viewing device viewing head and passing through the remote viewing device flexible tube; and

a software routine stored in the memory unit, the software routine directing the microprocessor and the servo control unit to extend a range of motion of the viewing head.

31. The system according to claim 30 wherein the extending the range of motion of the viewing head includes at least determining servo control signal values corresponding to a deflected and an undeflected location of the viewing head.